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January 25, 2018

Ms. Nancy Rumrill
U.S. Environmental Protection Agency
Region 9, Ground Water Office, WTR-9
75 Hawthorne Street
San Francisco, California 94105-3901

Subject: **Plugging and Abandonment Plan for DM-B and PVC Wells**

Dear Ms. Rumrill,

As you know, Florence Copper Inc. (FCI) is in the process of constructing the Production Test Facility (PTF) for the purpose of demonstrating the feasibility of in-situ copper recovery from the Poston Butte copper ore deposit. The PTF is being constructed in accordance with the requirements and conditions of the Underground Injection Control Permit No. R9UIC-AZ3-FY11-1 (UIC Permit). The UIC Permit requires that FCI submit prepare and submit plugging and abandonment plans and procedures for specific existing wells located within the Area of Review (AOR), for which abandonment details could not be identified, or that were abandoned by previous site owners using materials that do not meet requirements of the UIC Permit. Part II D(2) of the UIC Permit lists specific abandonment requirements associated with a well identified as DM-B. Part II D(3) of the UIC Permit lists specific abandonment requirements associated with wells identified as OB3-1, OB4-1, PW3-1, and PW4-1. The purpose of this document is to convey the plugging and abandonment plans for wells identified in Part II D(2) and Part II D(3) of the UIC Permit.

WELL DM-B

Background

Based on available records, well DM-B was constructed in 1974 to a depth of 611 feet below ground surface (bgs). The well was registered with the Arizona Department of Water Resources in 1993 as Well Registry ID 55-806521. The ADWR well imaged record well file is included as Attachment A.

The well was constructed for the purpose of conducting dewatering testing in preparation for development of a proposed open pit or underground copper mine. This well was drilled prior to plans for in-situ copper recovery at the project site and consequently construction was not documented to the

level of detail required by UIC regulations. Well DM-B is listed as abandoned in documentation received from previous site owners, however no abandonment or cementing records have been found to exist. An inspection of the well site revealed no surface casing or collar at the reported well location. However, a mud pit was identified adjacent to the reported well location. Florence Copper undertook a subsurface investigation to identify well abandonment details to the extent possible.

Investigation of DM-B Site

FCI located well DM-B based on two historical surveys conducted at the site by previous owners. Both surveys referenced the DM-B location and several core hole collars in the vicinity of well DM-B. Two of the corehole collars (139S and 149S) still exist at ground surface, and the survey locations of these collars correspond favorably with survey coordinates reported from the 1970's. Because there was no existing collar or surface casing evident at the DM-B site, FCI retained a surveyor to identify the location of well DM-B. The surveyed location was at the southeast corner of a drilling mud pit that dates from the 1970's which is consistent with other sites on the property where hydrologic wells were completed during that time period. FCI used this location information to conduct a subsurface investigation to identify abandonment methods and materials to the extent possible.

The subsurface investigation conducted to locate the DM-B well began by excavating the area in the vicinity of the surveyed location to a depth of 18 feet bgs. The mud pit was also excavated. During excavation, no steel surface casing or collar was identified. A metal detector was used periodically during the excavation efforts. Metallic and other artifacts recovered during excavation of the well location included a few pieces of welding rod, pull tabs, wire, and some household trash. No bentonite drilling mud, rust, or concrete debris was identified at the well location. Bentonite and general debris were identified in the mud pit.

Because the steel casing was not identified during excavation, a surficial geophysical survey of the area was completed by Hydrogeophysics, Inc. that included a magnetic survey and electrical resistivity survey of an area that extended 100 feet north and south of the location and 180 feet east and west of the location. Existing casings at the nearby coreholes were identified in the survey but no steel casing was identified at the DM-B location, the geophysical report is included as Attachment B.

The DM wells were installed during the early 1970's as part of the evaluation of the site to be completed as an open pit mine. Based on the historical remnants of the mud pit and the surveyed location, DM-B existed on the southeast corner of the 1970's era mud pit. Records from the 1970's indicate that selected well and corehole abandonments were carried out by cutting and pulling the casing. It is possible that the steel well casing was pulled following conclusion of the dewatering test, so that it would not pose a problem during excavation of the planned open pit. Otherwise the well casing would have to be cut repeatedly in segments during pit excavation, as the pit was advanced downward. Regardless of the method or purpose, it is apparent based on the subsurface excavation that the steel casing has been removed at well DM-B, and that the hole was at least partially backfilled with native soil. The presence of surficial debris at depth at the well DM-B location demonstrates that the well location has been positively identified.

DM-B Proposed Abandonment Plan

The UIC permit requirements for DM-B are presented in Part II D(2) of the permit and read as follows:

"As the cementing and abandonment records for the DM-B well are not available, DM-B well shall be re-entered, and the Permittee shall demonstrate subject to EPA's approval that cement is placed at the base of the USDW in the casing/wellbore annulus and to the surface within the casing. If this cannot be demonstrated to EPA's satisfaction, the Permittee shall re-plug the well to ensure cement is placed at the base of the USDW in the casing/wellbore annulus and to the surface within the casing. EPA shall be notified and final P&A plans and procedures shall be submitted to EPA for approval at least 30 days in advance of such plugging operations for the DM-B well."

In accordance with the UIC Permit, the DM-B borehole will be reentered and cleaned out to a depth of 100 feet below the documented Lower-Basin fill unit and the bedrock oxide unit, a depth of 663 feet bgs. The well will be entered using a bit with a nominal diameter of approximately 4-inches. Well DM-B will then be abandoned by installation of Type V neat cement grout from the total clean-out depth to five feet below land surface using the tremie grouting method. The grouting will be accomplished in one lift with the tremie no more than 30 feet above the bottom of the well. The location of DM-B is presented on the Area of Review Map, Figure A-9 of the UIC Permit Application, the figure is included in Appendix C.

PVC WELLS

There are four PVC test wells constructed by a previous site owner in which the casing annulus was sealed through the overlying USDW using bentonite grout. Bentonite grout is not considered to be an appropriate annular seal material for protection of USDW's.

The UIC permit requirements for the PVC test wells are presented in Part II D(3) of the permit and read as follows:

"The OB3-1, OB4-1, PW3-1, and PW4-1 wells in Table C-1 list bentonite grout seal in the casing annulus. The Permittee shall demonstrate, subject to EPA's approval, that this is Portland cement (with bentonite as an additive) or other acceptable material placed at the base of the USDW in the casing/wellbore annulus and to the surface within the casing prior to plugging operations. If this cannot be demonstrated to EPA's satisfaction, the Permittee shall perforate the casing and place Portland Type V or equivalent cement at the base of the USDW in the casing/wellbore annulus and to the surface within the casing. EPA shall be notified and final P&A plans and procedures shall be submitted to EPA for approval at least 30 days in advance of such plugging operations for these wells."

Video Inspection of PVC Wells

Video surveys were conducted on wells OB-1, PW3-1, OB4-1, and PW4-1 to assess the general condition of the well casing and to determine if the perforated intervals were open. The video survey results indicated that the perforated intervals were open, did not have appreciable scale or intrusion of bentonite seal material.

Plugging and Abandonment of the PVC Wells

Based on the requirements stated in Part II D(3) of the UIC Permit, it was decided to drill out and remove the PVC casing and bentonite grout annular seal material. These activities were conducted between _February and April 2017 under UIC Permit UIC No. AZ396000001, due to the fact that UIC Permit No. R9UIC-AZ3-FY11-1 had not yet been finalized, and UIC Permit No. AZ396000001 was still in effect at the time the abandonment activities were planned.

Prior to drilling out the PVC casing and bentonite annular seal material, Type V neat cement-grout was installed throughout the perforated interval of each well using the tremie grouting method. After the grout had cured, the cased portions of the wells were drilled out using the mud rotary drilling method. During drilling, cuttings were examined to ensure PVC was being returned and the boring was tracking the casing. After drilling to the top of the perforated interval, the full length of the open borehole was then grouted to 5 feet bgs using Type V neat cement grout. The top 5 feet was backfilled with native fill. Abandonment records for each of these wells are included in Attachment C.

Please contact me at 520-374-3984 ext. 3710 with any questions you may have regarding the content of this communication.

Sincerely,

Florence Copper Inc.

Dan Johnson
Vice President / General Manager

cc: Audrey Johnson, U.S. Environmental Protection Agency
Maribeth Greenslade, Arizona Department of Environmental Quality